

GAME DEPENDENCY AND AGGRESSIVE BEHAVIOR AMONG FORM TWO AND FORM FOUR STUDENTS IN KUALA LUMPUR

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The study intends to ascertain the relationships between game dependency and students' aggressive behavior and to what extent individual differences such as grade level, gender and parental control moderate this relationship. This study utilizes a mixed method design to examine the relationships between game dependency and aggressive behavior. Survey via questionnaire was used to collect data in selected secondary school in Kuala Lumpur. Subsequently, focus group interview was employed to probe further the video game issues from a group of heavy users who were identified from their video game habits. Eight hundred and fifteen secondary school students in Kuala Lumpur took part in this study. Descriptive statistics are used to ascertain the relationship between game dependency and aggressive behavior. In the present study, males are likely to play at dependent level more than females. Form Two gamers show smaller percentages of playing at dependent level compared to Form Four gamers. Game dependency did not differ significantly among different levels of parental control. Females recorded significantly higher mean on aggressive behavior than males. Findings in this study show that game dependency is positively correlated with self-reported of aggressive behavior. Game dependency appears to have moderate relationship with aggressive behavior. Results from the interview data revealed that heavy users somehow agreed that they encountered emotional and behavioral changes from playing video games. These results suggest that once gamers are 'dependent' on game activity, they are likely to show more aggressive inclination through higher level of aggressive behavior. This means that the probability for addicted gamers to engage in aggressive behavior and endorse violent behavior is higher compared to non-addicted gamers. The findings also implicated that video games could be innovative learning tools, which not only enhance effectiveness of teaching, but also are a training platform for aggression. Game dependency seems an innovative way to explain psychology of learning for aggressive behavior.

Keywords: Game dependency, aggressive behavior, individual differences

The video game, a by product of computer technology, serves many functions, notable among them are as an entertainment tool and a teaching aid. As an entertainment tool, it entertains players with a variety of themes and interesting story-lines depicted through sophisticated graphics (Anderson, 2002; Gentile & Anderson, 2003; Griffiths & Hunt, 1998). The sound effect of the games makes it even more interesting. As a teaching aid, the video game is used to enhance learning efficiency and improve academic achievement (Dill & Dill, 1998; Gentile & Anderson, 2003). Children can learn new information and improve particular skills through educational games.

Today's video games are rich combinations of narrative, story-line, music, and graphic design. Thousands of video games are available with contents including just about anything imaginable in both education and entertainment genres. Gamers now have more choices of the types of games to play compared to the past three decades (Anderson, 2003; Anderson, Gentile, & Buckley, 2007). The video game industry is a growing business in Malaysia especially in the urban areas. Children can easily obtain computer games on CDs and access to the Internet. Players play through the Internet with others throughout the world. It is indeed very exciting and challenging to engage in game play that could give great satisfaction especially when they get better scores than others

(Anderson, 2004; Anderson et al., 2007; Griffiths & Hunt, 1998; Roe & Muijs, 1998). Praise and admiration from peers and onlookers further stimulates them to persist in the game play.

Inevitably, video games represent the point of convergence of the twentieth century's two most important communication technologies—the computer's interactivity with television's powerful story telling (Cohen, 2000). Interactive media has redefined children's leisure activities (Funk, Buchman, Jenks, & Bechtoldt, 2003). As adolescents become heavily involved in game play activities, there is a need to study these interactive media habits more closely, especially to find out whether they have any impact on a player's personality. It is learnt that adolescents who are hooked on video game play have been linked with a number of risk factors for maladaptive development. For instance, aggressive behavior is related to video game play (Dzul kifli Abdul Razak, 2000). The effects of exposure to video game violence have received increasing attention from parents, scholars, educators and policy makers. Meanwhile, the issue of adolescents addicted to video games and playing truant in cybercafés that were highlighted in the media further creates concern in the researcher to investigate the issue empirically.

Researchers have voiced concern that parents lack information about their children's video game habits. Many parents are unaware of the danger posed to their children if game habits go unmonitored (Anderson & Buckley, 2003; Funk et al., 2003; Gentile et al., 2004; Walsh, 2001). Findings from this research will provide information to parents who need to have some kind of supervision over children who are engaging in violent video games. Parents can play an important role in creating media-literate children only if they discuss explicitly what is being acted (Walsh et al., 2003).

Video Games as Learning Tools

Since 1984, video games have been suggested for use in school to assist the transfer and generalization of knowledge and skills. Today, video games are perceived as effective learning tools to promote aggressive behaviors (Dill & Dill, 1998; Gentile & Anderson, 2003). It is in part due to their entertainment value, violent content and various physical features such as action and visual violence. Many researchers query if video game violence could have similar or even greater effects than television (Anderson, 2004; Anderson & Dill, 2000; Silvern & Williamson, 1987). The major argument is derived from the belief that games are interactive in nature compared to television. A player has to identify with any one of the characters in the games and perform the actions that ensure a win. Active participation and full concentration on games further increase the game's effect on players (Anderson & Bushman, 2001; Anderson & Dill, 2000; Dill & Dill, 1998; Roe & Muijs, 1998). Additionally, as video games could provide a forum for learning, it is reasonable to believe that players learnt aggressive behavior from the games (Anderson & Dill, 2000; Sherry, 2001). According to the psychology of learning theory by Bandura (1977), if the game's content features aggressive behaviors, players will learn the behaviors through modeling, reinforcement and rehearsal.

Theoretically, video games might have the capacity to promote aggressive behavior (Huesmann & Miller, 1994). That is, children will imitate what they see on screen. Besides, video games simultaneously expose the player to modeling, reinforcement and rehearsal of behaviors. The combination of these methods of learning has been shown to affect behavior significantly more than any of the methods used individually (Anderson & Dill, 2000). This means that a child playing violent video games may learn that hitting or even shooting another person is the appropriate response in a conflict situation and that this type of aggression is most probably to be reinforced. Furthermore, game players are rewarded directly for playing symbolic violence and therefore may transfer the learned aggression to the outside world (Bandura, 1977).

As such, one of the main concerns about adolescent video game habits is that most of the video games feature violent elements. These violent elements may have a detrimental effect on an individual's personality if the person was exposed to such violent games for a prolonged period (Anderson & Bushman, 2001; Anderson & Dill, 2000; Anderson et al., 2007; Gentile et al., 2004). Moreover, recent content analysis of video games found that violent games nowadays show more graphically realistic violence in which human-like characters fight to the death (Anderson, 2002; Dill, Gentile, Richter, & Dill, 2003). These findings inevitably cause more worry among researchers as well as parents. To date, some studies have indicated that there is a positive relationship between

playing violent video games and an increase in hostility and aggressive behavior (Anderson, 2004; Anderson et al., 2004; Anderson & Dill, 2000; Anderson & Gentile, 2003; Funk, 1993; Griffiths, 1991; Griffiths & Hunt, 1998; Irwin & Gross, 1995).

Addictive Nature of Video Games

The other worrisome aspect of video game activity is the addictive nature of the video games (Chiu, Lee, & Huang, 2004; Fisher, 1994; Griffiths & Hunt, 1998; Hauge & Gentile, 2003). As players become deeply involved in the games, they are usually engrossed in the games for up to three hours in one sitting (Griffiths & Hunt, 1998; Roe & Muijs, 1998). Past studies noted that video games are potentially addictive and many children seemed addicted to video games (Chiu et al., 2004; Fisher, 1994; Griffiths, 1991, 1993; Griffiths & Hunt, 1998). These potential problems are exacerbated as video game technology improves and many popular games incorporate the communications network of the Internet to allow worldwide multiplayer competition. The Internet has also been alleged to possess addictive potential (Brenner, 1997; Young, 1996). As online video games are synthesized with the Internet, they combine a great deal of allure of both media outlets in a single offering. The additive effects could be even greater.

Previous studies have found some evidence for video game dependency. Fisher's (1994) study of 467 British secondary school students indicates similarities between some participants' video game play habits and pathological gambling behaviors. In 1995, Philips et al. surveyed 816 children aged 10 to 16 and reported that about 5.7% showed dependent characteristics in their video game play. A questionnaire study by Griffiths and Hunt (1998) reported that about one fifth of the sample of 387, comprising 12 to 16 year olds exhibited dependent characteristics. These results present a strong case that video games have addictive potential.

Meanwhile, Griffiths (1999) pointed out that the video games of the 21st century may in some ways be more psychologically rewarding than games of the 1980s. If these games offer greater "psychological rewards", players might be more at risk of developing an addiction. This can be explained by a few reasons. A number of different important mechanics are inserted into a game to keep the user addicted. These mechanics are key critical psychological inputs toward addiction. They represent some kind of built-in reinforcements and rewards within the games themselves. The most common form of reward in almost all games is the basic point scoring system where points are rewarded if there is success in shooting or destroying (Gentile & Anderson, 2003). The score is visually picked up by players; as it increases, it shows that they are becoming better.

Another reward is that of beating previously set high scores reached by others, or which the programs of the games have set as a direct incentive, of which doing so allows the insertion of initials or names. Gaining extra lives, extending game time for game play, or progressing to the next level are some of the other rewards given. The most powerful reward is that of completing a game and reaching the ending. This results in the player becoming a master and gives a sense of victory and positive achievement as reaching the ending takes days, weeks or sometimes months to achieve. The amount of reinforcement and the time spent on games decide how addictive the games are (Loftus & Loftus, 1983).

One of the latest studies on video game addiction revealed that gamers who were addicted to games are involved in more physical fights than the non-addicted gamers (Hauge & Gentile, 2003). The results also suggested that video game "addiction" is a problem among adolescents, particularly among males, and that addiction is associated with adjustment problems such as school performance and aggressive attitudes and behaviors.

Clearly, if an adolescent becomes addicted to video games it can be a problem (Chiu et al., 2004; Griffiths & Hunt, 1998; Hauge & Gentile, 2003; McClure & Mears, 1984). It has been noted that dependency on video games could feed other delinquent behaviors such as stealing money to buy new games (Griffiths & Hunt, 1998), or playing truant in order to play video games (Griffiths & Hunt, 1998; Keepers, 1990), failing to do homework (Chiu et al., 2004; Griffiths & Hunt, 1998) or demonstrating extreme annoyance when unable to play (Griffiths & Hunt, 1995, 1998; Soper & Miller, 1983). As in western youth culture, playing video games has become a habit for teens in Malaysia too. Many teenagers involve heavily in video game activity and exhibit dependency

symptoms. Playing video games influences their daily activities and replaces other activities, such as reading, sports, doing homework or communicating with friends and family members.

Purpose of the Present Study

Given the knowledge that video games are potentially addictive, and that the majority of the games are violent, it is important to explore the relationship between playing these games and players' personality characteristics. In addition, the study will ascertain the claims whether there is a relationship between game dependency and aggressive behavior among video game players. Finally, the study will ascertain to what extent personal variables such as gender, grade levels and parental control influence game dependency and aggressive behavior.

Methodology

The study employed sequential explanatory mixed method to collect data. The sequential explanatory mixed method design consists of first collecting quantitative data and then using qualitative data to substantiate the quantitative results.

Sample

The achieved sample comprised 841 (430 Form Two and 385 Form Four) secondary school students from ten schools in Kuala Lumpur. After data analysis, there were 26 cases of incomplete responses to certain items in the questionnaire. As a result, these were dropped from this study, leaving an achieved sample of 815. The sample included 527 boys and 288 girls. Of these, 179 participants were non-player of video games. Subsequently, some 23 students who have been identified as video game heavy users were selected for the interview session. They were selected as they reported spending more than 30 hours a week on video game activity and preferring violent content games. A few interview sessions were conducted to gain in-depth understanding of the possible impact of video game violence on gamers' personality characteristics.

Instruments

A self-report "video game habits questionnaire" (VGQ) was used to obtain data on demographics and video game habits. The demographic data included age, grade levels, gender, ethnicity, parent's occupation and salary scales, domicile and information on part-time job. Meanwhile, the video game habits survey gathered descriptive data about students' game habits. Specifically, data included game dependency. An adapted version of the DSM-IV criteria for pathological gambling (American Psychiatric Association, 1994) was used to measure game dependency. This version is related directly to playing video games. Eight questions relating to the DSM-IV criteria were adapted for video game playing. Respondents only answered *Yes* or *No* for each question. A cut-off point of four is assumed to indicate a participant was playing at dependent levels at the time of the study (Griffiths & Hunt, 1998). Respondents who answer 'Yes' to four or more of the addiction items were classified as "playing at dependent levels" and all others were classified as "non-dependent" (Hauge & Gentile, 2003). The Buss-Perry Aggression Questionnaire (AQ) (1992) was used to measure aggressive behavior. It comprises 29 items which scored on a scale ranging from 1 (strongly disagree) to 5 (strongly agree).

Procedure

The researcher first obtained written permission from the Educational Planning and Research Division (EPRD) of the Ministry of Education, Malaysia for the study. Later, the researcher sought written permission from the state education department in order to carry out the research in the school. The researcher then approached the administrator of the school to coordinate the data collection. A survey form was distributed to gather prior information on personality aggressiveness (aggressive behavior

and attitudes toward violence). Subsequently, the researcher distributed another survey form to the same group of students to gather information on video game habits. The two survey forms were collected concurrently. The duration for survey is approximately 30 minutes for each session. The researcher conducted the survey personally. The purpose of the study and the method of answering were explained to the sample before administration of the instruments. Semi-structured interviews were used to gather data on game dependency by heavy users. The semi-structured interview was guided by a set of questions and issues to be explored. After each question, a series of probes were followed. The interviews with respondents were conducted in the respective schools. The transcriptions of all respondents' interviews were given to the respondents for verification in order to avoid misinterpretation or over-generalization on the part of the researcher. The entire interviews were audio recorded and transcribed verbatim by the researcher herself.

Results

Game Dependency

Game dependency refers to the nature of game play activity, whether the players are playing video games at dependent level or not. Table 1 presents the data for game dependency among players. The percentages of males (58.9%) playing at dependent level were greater than those who do not play at dependent level (41.4%). On average too, there were higher percentages (57.9%) of non-dependent female players than dependent female players (42.1%). For grade levels, as noted, both Form Four and Form Two players recorded higher percentages on playing games at dependent level than non-dependent level. Data also showed that percentages of Form Four players playing video games at dependent level (57.2%) were greater than for Form Two players (52.4%). As non-players are not involved in game activity, they were excluded from the analysis. As shown in Table 1 too, there were relatively more players under low parental control (55.6%) who played video games at dependent level than players under high parental control (53.9%). Conversely, percentages of players playing at non-dependent level were higher for students under high parental control (46.1%) than for those under low parental control (44.4%).

Table 1

Frequency and Percentage of Game Dependency among Video Game Players

Characteristics	Dependent		Non-dependent		Total	
	n	%	n	%	n	%
Gender						
Male	281	58.9	196	41.1	477	100
Female	67	42.1	92	57.9	159	100
Grade Level						
Form Two	173	52.4	157	47.6	330	100
Form Four	175	57.2	131	42.8	306	100
Parental Control						
Low PC	175	55.6	140	44.4	315	100
High PC	173	53.9	148	46.1	321	100
Total	348	54.7	288	45.3	636	100

Note. PC=Parental Control

As shown in Table 2, from the dependent angle, players admitted the reason for playing games was for excitement (92.8%) and to chase personal high score in the game (63.4%). As a result, they play games frequently most days (62.7%) and give little effort to stop or decrease the habit (57.5%). However, they did not agree they frequently play for a long period of time (46.7%); become restless if they cannot play (29.7%); play games instead of attending school activities (14.9%) and sacrifice social activities to play games (13.7%).

Table 2

Frequency and Percentages for Answer 'Yes' of Each Item in Game Dependency

No	Items	n	%
1	Do you frequently play most days?	399	62.7
2	Do you frequently play for long period of time?	298	46.7
3	Do you play to get excitement or a "buzz"?	584	92.8
4	Do you play to beat your personal high score?	403	63.4
5	Do you repeat efforts to stop or decrease playing?	366	57.5
6	Do you become restless if you cannot play?	189	29.7
7	Do you play instead of attending to school related activities?	95	14.9
8	Do you sacrifice social activities to play?	87	13.7

It can be concluded that the majority of players were not playing for long periods. It was also consistent with the prior findings in this study that the majority of players (35.1%) are infrequent players who played less than 2 hours a day or fewer than 10 hours a week. Findings reveal that time spent on games seems to play little role in influencing players' game dependency. A relatively lower percentage of players will replace school activities and social activities with games activities.

Differences in Game Dependency among Personal Variables

As shown in Table 3, it is interesting that there were significant differences in the endorsement of scale items reflecting game dependency between male and female students ($U = 29516.00$, $z = 3.90$, $p < .05$). Results indicate that probability of the two medians being the same is very small. Thus, it can be concluded that male and female players demonstrated significant differences in game dependency. The number of males who perceived that they were playing games at dependent levels was significantly higher than females. For grade level, there were no significant differences among Form Two and Form Four students in game dependency ($U = 48476.50$, $z = .89$, $p > .05$). Results indicate that probability of the two medians being different is very small. Thus, it can be concluded that Form Two and Form Four players do not demonstrate significant differences in game dependency. For game dependency in relation to levels of parental control, results revealed no significant differences in game dependency among different levels of parental control ($U = 48409.50$, $z = 1.09$, $p > .05$). Results as shown in Table 3 indicate that probability of the two medians being different is very small. Thus, it can be concluded that levels of parental control seem to play very little role in influencing players' game dependency.

Table 3
Mann-Whitney U Test for the Differences in Game Dependency

Personal Variables	Mean Rank	U	z	p
Male	334.17	29516.50	3.90	.00*
Female	269.17			
Form Two	317.40	48476.50	.89	.38
Form Four	325.08			
Low Parental Control	325.32	48409.50	1.09	.28
High Parental Control	311.81			

Note. $p < .05$

Relationship between Game Dependency and Aggressive Behavior

As shown in Table 4, the Pearson Correlation is .27. It shows that game dependency has moderate and positive relationship with aggressive behavior. The more 'dependent' on game activities, the more aggressive behavior is shown by the gamers.

Table 4
Relationship between Game Dependency and Aggressive Behavior

Variables	r	P
Game Dependency	.27	.00*
Aggressive Behavior		

Note. $p < .05$

Interview Data

During the interview, more the 50% (15/23) of participants revealed that they have tendency to show emotional and behavioral changes from the video game activity. Some of them (6/23) reveal that they tend to get hostile easily. They also have tendency to scold or shout if distractions occur during game activity. They most probably will feel angry, frustrated or show temper if they lost the games. Due to compulsive game habits, Form Four participants seem to suggest that they have experienced stress and frustration occasionally. They sometimes may be out of control of their emotion. As such, they tend to get angry easily and thus get involved in quarrels. Participants seem to suggest that playing games is likely to arouse emotion. On the other hand, about 80% (20/23) of the participants seem to claim that their satisfaction arises from winning the games. They suggest that satisfaction comes from hitting the characters in the games. It is partly due to the fact that hitting characters is as if they are hitting the person they dislike in their social life. Some four participants said that the feeling of hitting people is very good. A participant seems to suggest that satisfaction is derived from killing. If this is indeed the true feeling derived from playing games, it is a great worry to the researcher.

In terms of behavioral changes derived from game habits, it is very likely that their behavior may become violent. This is based on the claims that through imitation, players may learn the fighting skills from the games such as WWE. They seem to believe that playing violent games such as WWE make them become violent. They can perform what they learnt from the game WWE even though the actions are perceived as 'dangerous'. When asked whether violent video games could cause aggressive behavior, they tend to claim that it depends on the person's personality. There is a tendency for those psychologically immature to be influenced by the game's content. All the participants agreed that video game contents teach them how to kill but rarely teach them that they should bear consequences for the killing. Killing is a 'must do' thing in every game in order to win. Additionally, some participants (8/23) suggest that players probably may show aggressive behavior but add that it is unlikely for them to become killers in reality as society has law and enforcement.

In addition, one of the Form Four participants seems to suggest that playing extremely violent games may affect player behavior. Violent behavior is partly due to aggressive tendency. Some two participants claim that it depends on the game's graphics; if it is 3D graphics, it may affect behavior. Some three participants seem to claim that if someone's personality is aggressive, and being addicted to game activity, after exposure to video game violence, he may have the tendency to perform violent acts if he gets angry. They felt that playing too many violent video games may develop aggressive tendency among gamers. Some three participants felt that one of the effects of playing violent video games is players may have tendency to learn from games and perform it in reality. If addicted to games players may be influenced in ways to break the law in order to win in real life. Players' aim is to win the games by continuously killing opponents. Moreover, they agreed that players' behavior may be affected by games content through modeling. Games motivate them to get higher level of ranking or buy more powerful weapons in order to win the games. For example, in war games, skills are limited to shooting and bombing. There are strategies to conquer and win the games. They said that killing and fighting are normal in every game. This is the interesting aspect in the games. They explained that killing only involves monsters and not people. Playing video games seem to have great potential to develop delinquent behavior among players. A Form Two participant revealed that his friends used to steal money for the sake of playing games in cyber cafés.

Discussion

In this study, males reported having higher percentages of playing at dependent level than females, perhaps partially due to the feelings of dominance the male may acquire in game playing (Dietz, 1998; Griffiths & Hunt, 1998). Further analysis indicated that dependent gamers were significantly more likely to report aggressive feelings as a direct result of their computer game playing. Dependent gamers played more frequently, played longer per session, and had started playing at a younger age than non-dependent gamers. The increases in the percentages of dependent gamers compared to past studies perhaps are due to the evolution of game technology. As noted before, today's video games feature increased realism in game graphics and greater scope of game content hence producing a far more alluring digital world. Moreover, online games enable players to interact with real life opponents and gamers worldwide. These have added a new dimension to the medium's potential for game dependency.

On the other hand, no significant differences were found in game dependency among different levels of parental control. It is possible that the differences are unable to yield significant results even though more dependent gamers are under low parental control. Thus, parental control is less likely to play a role in influencing children's game dependency.

Findings from interviews provide additional evidence that if addicted to video games, gamers were more likely to sacrifice their education or homework for game activities. If this is a true reflection of what is sacrificed, then there is some cause for concern as the sacrificing of education may have more severe consequences on gamers' career development in future. If they sacrificed sleep in order to play, this too may have consequences on productivity in other areas of their lives (Griffiths et al., 2004). Moreover, participants seem to agree that players tend to imitate what they have learnt from the games and perform it in reality. Gamers' behavior may be affected by games content through modeling and learning as games involve continuously killing opponents. Gamers can learn many

complicated behaviors, attitudes, beliefs and perceptual schemata through observation and participation in video games. And as they observe and perform these new behaviors they are also learning scripts. Once a script is learned, it can guide how they perceive and interpret similar situations, and guide their behavior. If aggressive scripts are learned, it is more likely that they act out aggressive behavior when enough cues activate the scripts. Lately, especially since violent games were implicated in school shooting (Columbine High School in Littleton, Colorado), violent video games have been considered as a contributing factor to aggressive behavior (Anderson & Dill, 2000; Anderson, Gentile, & Buckley, 2007; Fleming & Rickwood, 2001; Kirsh, 2003).

Additionally, findings suggest that men and women differ in terms of the mode of aggression that they typically prefer to use. Men are likely to be more physically aggressive than women (Bettencourt & Miller, 1996, Reinisch & Sanders, 1986); and women tend to show more verbal aggression than men (Eagly & Steffen, 1986). Females are more capable of inhibiting emotional arousal and related responses than males (Eisenberg & Fabes, 1999). It means that when emotionally aroused, females may be more likely to regulate their emotions and to inhibit their responses in a manner that precludes aggression. Males seem to be more quickly and are easily aroused by relatively strong stimuli, and take a longer time to return to baseline levels, than females (Fabes, 1994). Findings in this study show that females recorded significant higher mean on 'anger' than males. Conditions that evoke anger in women tend to be different from those that elicit anger in men. For example, Harris (1993) found that women are more angered than men if being provoked. The relative inexperience of girls with video games might make them more susceptible to violent video game effects (Cooper & Mackie, 1986). As such, video games may stimulate a more violent reaction in girls than in boys. Moreover, according to Huesmann (1986), girls are likely to have less exposure to media violence; they are the group likely to be more aroused by the exposure. Perhaps girls experience more frustration with using a computer for play. The frustration and anxiety that they encounter during game play may influence their aggressive inclination. Surprisingly, this finding is corroborated by some of the previous evidence (e.g., Anderson & Dill, 2000; Cooper & Mackie, 1986).

In comparing aggressive behavior among different grade levels, Form Four players recorded higher mean on aggressive behavior than Form Two players. However, the differences are not significant. This finding suggests that ages that are only different by about 1-2 years may not yield significant differences in the influences of video game violence. It is likely that violent video games have different effects depending on participants' level of development (Bartholow & Anderson, 2002). The effects of violent video game play should be more pronounced in early adolescence than in middle and late adolescence (Kirsh, 2003). Form Two gamers are in their early adolescence stage. Aggressive behaviors are likely to be increased during the early adolescence stage due to new and increasing challenges in social and emotional aspects particularly at school, with the parents and peers (Kirsh, 2003; Steinberg, 2001). Besides, early adolescence is also a time of increased negative affect and depression (Kirsh, 2003; Spear, 2000). Gamers in early adolescence increased in aggressive behaviors possibly due to the increase in negative affect and depression. Playing violent video games may cause emotional and physiological arousal. The heightened emotion and physiological arousal experienced by early adolescents would interact with internal state arousal to create a cumulative level of internal state arousal thus resulting in more aggressive behaviors (Anderson & Bushman, 2002; Anderson & Dill, 2000). In addition, more aggressive responding in early adolescence than in middle and late adolescence could also result from cognitive deficiencies (Kirsh, 2003). Early adolescents tend to act impulsively and with little cognitive evaluation during stressful situations. Thus, even if a state of hostile cognitions and affects occur after violent video game play, late adolescents would be less likely than early adolescents to act aggressively due to their increased cognitive ability and better decision-making processes (Kirsh, 2003).

Conclusion

Video games have broad and deep influences on adolescents. These results suggest that once gamers are 'dependent' on game activity, they are likely to show more aggressive inclination through higher level of aggressive behavior. This means that the probability for addicted gamers to engage in aggressive behavior and endorse violent behavior is higher compared to non-addicted gamers. The

findings also implicated that video games could be innovative learning tools, and also a training platform for aggression. Game dependency seems as an innovative way to explain the psychology of learning for aggressive behavior.

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